EXHIBIT A

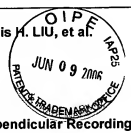
TRANSMITTAL FORM

Attorney Docket No. K35R1832/3845P

In re the application of: **Francis H. LIU, et al.**

Serial No: **10/724,385**

Filed: **November 26, 2003**



Confirmation No: **9663**

Group Art Unit: **2653**

Examiner: **Heinz, Allen J.**

For: **Magnetic Head for Perpendicular Recording with Magnetic Structure Providing Non-Perpendicular Write Field**

ENCLOSURES *(check all that apply)*

■ Amendment/Reply	☐ Assignment and Recordation Cover Sheet	☐ After Allowance Communication to Group
☐ After Final	☐ Part B-Issue Fee Transmittal	☐ Notice of Appeal
☐ Information disclosure statement	☐ Letter to Draftsman	☐ Appeal Brief
☐ Substitute Form 1449	☐ Drawings	☐ Status Letter
☐ Reference Copies	☐ Petition	■ Postcard
☐ Extension of Time Request *	☐ Fee Address Indication Form	☐ Other Enclosure(s) (*please identify below*):
☐ Express Abandonment	☐ Terminal Disclaimer	
☐ Certified Copy of Priority Doc	☐ Power of Attorney and Revocation of Prior Powers	
☐ Response to Incomplete Appln	☐ Change of Correspondence Address	
☐ Response to Missing Parts	*Extension of Term: Pursuant to 37 CFR 1.136, Applicant petitions the Commissioner to extend the time for response for xxxxxx month(s),	
☐ Executed Declaration by Inventor(s)	from to .	

CLAIMS

FOR	Claims Remaining After Amendment	Highest # of Claims Previously Paid For	Extra Claims	RATE	FEE
Total Claims	35	32	3	$ 50.00	$ 150.00
Independent Claims	13	3	10	$200.00	$ 2,000.00
				Total Fees	$2,150.00

METHOD OF PAYMENT

■ Check no. 9820 in the amount of $ 2,150.00 is enclosed for payment of excess claims fees.

■ Charge any additional fees or credit any overpayment to Deposit Account No. 02-2120 (Sawyer Law Group LLP)

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Attorney Name	Janyce R. Mitchell, Reg. No. 40,095
Signature	/Janyce R. Mitchell/Reg. No. 40,095 Janyce R. Mitchell
Date	June 6, 2006

CERTIFICATE OF TRANSMISSION/MAILING

I hereby certify that this correspondence is being facsimile transmitted to the USPTO or deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Mail Stop Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on 6/6/2006.

Type or printed name	Kym Moore
Signature	

CERTIFICATE OF MAIL

I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class Mail in an envelope addressed to Mail Stop Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on June 6, 2006.

Kym Moore

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re Application of:	Date: June 6, 2006
Francis H. LIU et al.	Confirmation No: 9663
Serial No: 10/724,385	Group Art Unit: 2653
Filed: November 26, 2003	Examiner: Heinz, Allen

For: MAGNETIC HEAD FOR PERPENDICULAR RECORDING WITH MAGNETIC LOOP PROVIDING NON-PERPENDICULAR WRITE FIELD

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

AMENDMENT

Sir:

In response to the Office Action dated March 16, 2006, please amend the above-identified application in the following manner:

Amendments to the Specification begin on page 2 of this paper.

Amendments to the Claims are reflected in the listing of claims which begins on page 3 of this paper.

Remarks/Arguments begin on page 19 of this paper.

06/12/2006 HVUONG1 00000012 10724385

01 FC:1202 150.00 OP
02 FC:1201 2000.00 OP

Amendments to the Specification:

Please replace the title with:

TRAILING EDGE RECORDING MAGNETIC HEAD WITH REVERSED DOUBLE BIAS COIL AND DEFLECTION POLE FOR PERPENDICULAR RECORDING WITH A NON-PERPENDICULAR WRITE FIELD

Paragraph [0001]

Related disclosure of an electromagnetic head for writing information on a relatively-moving medium can be found in the U.S. Patent Application, Serial No. 10/724,309, entitled Magnetic Head for Perpendicular Recording with Magnetic Structure Providing Non-Perpendicular Write Field, by the same inventors and filed on November 26, 2003~~on even date herewith~~, and assigned to the assignee of the present application, which is incorporated by reference herein

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A magnetic head for writing information on a relatively-moving medium, the head comprising:

a body having a leading end, a trailing end and a medium-facing surface;

a first ferromagnetic layer disposed in the body and terminating in a first pole tip disposed adjacent to the medium-facing surface;

a second ferromagnetic layer magnetically coupled to the first ferromagnetic layer distal to the medium-facing surface and terminating in a ~~third~~ second pole tip that is disposed adjacent to the medium-facing surface, between the first pole tip and the trailing end, and spaced from the first pole tip by a nanoscale nonferromagnetic gap;

a third ferromagnetic layer magnetically coupled to the first ferromagnetic layer distal to the medium-facing surface and terminating in a third pole tip disposed adjacent to the medium-facing surface and at least one micron from the first pole tip, the third pole tip having a medium-facing area that is at least two orders of magnitude greater than that of the first pole tip, the third pole tip residing between the first pole tip and the leading end; and

an electrically conductive coil section disposed between the second ferromagnetic layer and the third ferromagnetic layer to induce magnetic flux in the first ferromagnetic layer.

2. (Original) The head of claim 1, further comprising an electrically conductive winding section electrically connected to the coil section, with the first ferromagnetic layer disposed between the

coils section and the winding section, such that a current flowing in a first direction in the coil section flows in a substantially opposite direction in the winding section.

3. (Original) The head of claim 1, wherein the spacing between the first pole tip and the second pole tip is approximately equal to a distance between the first pole tip and a soft magnetic layer of the medium.

4. (Original) The head of claim 1, wherein the second pole tip has a medium-facing area at least two orders of magnitude grater than that of the first pole tip.

5. (Original) The head of claim 1, wherein the coil section is part of an electrically conductive coil that spirals around a first magnetic section that magnetically couples the first ferromagnetic layer to the second ferromagnetic layer, and the coil is connected to an electrically conductive winding that spirals around a second magnetic section that magnetically couples the first ferromagnetic layer to the third ferromagnetic layer, such that a current flowing in a first direction in the coil flows in a substantially opposite direction in the winding.

6. (Original) The head of claim 1, wherein the first ferromagnetic layer has a thickness that is less than one-half micron.

7. (Original) The head of claim 1, further comprising a fourth ferromagnetic layer adjoining the first ferromagnetic layer and terminating further than the first pole tip from the medium-facing surface.

8. (Original) The head of claim 1, wherein the first pole tip has a trailing edge disposed adjacent to the trailing end, and magnetic flux emanating from the first pole tip is strongest adjacent the trailing corner and directed at an angle that is not perpendicular to the first pole tip.

9. (Original) The head of claim 1, wherein the nonferromagnetic gap expands at a throat height, the throat height being measured from the medium-facing surface and being less than one-half micron.

10. (Original) The head of claim 1, further comprising a magnetoresistive sensor disposed between a plurality of ferromagnetic shields and adjacent to the return pole tip.

11. (Original) The head of claim 1, further comprising a magnetoresistive sensor disposed less than one-half micron from the return pole tip.

12. (Currently Amended) A magnetic head for writing information on a relatively-moving medium including a media layer and a soft magnetic underlayer, the head comprising:

a body having a leading end, a trailing end and a medium-facing surface;

a first ferromagnetic loop terminating in a write pole tip and a return pole tip that are disposed adjacent to the medium-facing surface and separated from each other by more than one micron, the return pole tip residing between the write pole tip and the leading end;

a second magnetic loop terminating in the write pole tip and a deflection pole tip that is disposed adjacent to the medium-facing surface between the write pole tip and the trailing end,

the write pole tip and the deflection pole tip magnetically coupled to each other across a nanoscale nonmagnetic gap; and

an electrically conductive coil section that is at least partly encircled by one of the magnetic loops to induce a magnetic flux to traverse the write pole tip;

wherein the magnetic flux traversing the write pole tip has a maximum strength in the media layer at a ~~location that is closer than~~ distance from the write pole tip that is less than a spacing between the write pole tip and ~~to~~ the trailing end.

13. (Original) The head of claim 12, wherein the write pole tip has a trailing corner disposed closest to the trailing end, and magnetic flux emanating from the write pole tip is has a maximum density emanating from the trailing corner and directed at an angle that is not perpendicular to the write pole tip.

14. (Original) The head of claim 12, further comprising an electrically conductive winding section electrically connected to the coil section, such that a current flowing in a first direction in the coil section flows in a substantially opposite direction in the winding section, with the coil section disposed between the write pole tip and the trailing end, and the winding section disposed between the write pole tip and the leading end.

15. (Original) The head of claim 14, wherein the coil section is part of an electrically conductive coil that spirals around a first magnetic section that magnetically couples the write pole tip to the return pole tip, and the winding section is part of an electrically conductive winding that spirals around a second magnetic section that magnetically couples the write pole tip to the deflection

pole tip, such that a current flowing in a first direction in the coil flows in a substantially opposite direction in the winding.

16. (Original) The head of claim 12, wherein the coil section is part of an electrically conductive coil that spirals around a first magnetic section that magnetically couples the write pole tip to the return pole tip, and the coil is connected toe an electrically conductive winding that spirals around a second magnetic section that magnetically couples the write pole tip to the deflection pole tip, such that a current flowing in a first direction in the coil flows in a substantially opposite direction in the winding.

17. (Currently Amended) ~~The head of claim 12,~~ A magnetic head for writing information on a relatively-moving medium including a media layer and a soft magnetic underlayer, the head comprising:

a body having a leading end, a trailing end and a medium-facing surface;

a first ferromagnetic loop terminating in a write pole tip and a return pole tip that are disposed adjacent to the medium-facing surface and separated from each other by more than one micron;

a second magnetic loop terminating in the write pole tip and a deflection pole tip that is disposed adjacent to the medium-facing surface between the write pole tip and the trailing end, the write pole tip and the deflection pole tip magnetically coupled to each other across a nanoscale nonmagnetic gap;

an electrically conductive coil section that is at least partly encircled by one of the magnetic loops to induce a magnetic flux to traverse the write pole tip;

wherein the magnetic flux traversing the write pole tip has a maximum strength in the media layer at a distance from the write pole tip that is less than a spacing between the write pole tip and the trailing end; and

wherein the write pole tip has a medium-facing area that is less than about thirty thousand square nanometers.

18. (Original) The head of claim 12, wherein the write pole tip has a trailing corner adjoining the nonmagnetic gap, and magnetic flux emanating from the trailing corner has a maximum density at an angle that is between about twenty degrees and sixty degrees from perpendicular to the medium-facing surface.

19. (Currently Amended) ~~The head of claim 12,~~ A magnetic head for writing information on a relatively-moving medium including a media layer and a soft magnetic underlayer, the head comprising:

a body having a leading end, a trailing end and a medium-facing surface;

a first ferromagnetic loop terminating in a write pole tip and a return pole tip that are disposed adjacent to the medium-facing surface and separated from each other by more than one micron;

a second magnetic loop terminating in the write pole tip and a deflection pole tip that is disposed adjacent to the medium-facing surface between the write pole tip and the trailing end, the write pole tip and the deflection pole tip magnetically coupled to each other across a nanoscale nonmagnetic gap;

an electrically conductive coil section that is at least partly encircled by one of the magnetic loops to induce a magnetic flux to traverse the write pole tip;

wherein the magnetic flux traversing the write pole tip has a maximum strength in the media layer at a distance from the write pole tip that is less than a spacing between the write pole tip and the trailing end; and

wherein the write pole tip has a trailing corner adjoining the nonmagnetic gap, the return pole tip has a leading corner adjoining the nonmagnetic gap, and the trailing corner is made of higher magnetic saturation material than that of the leading corner.

20. (Currently Amended) ~~The head of claim 12,~~ A magnetic head for writing information on a relatively-moving medium including a media layer and a soft magnetic underlayer, the head comprising:

a body having a leading end, a trailing end and a medium-facing surface;

a first ferromagnetic loop terminating in a write pole tip and a return pole tip that are disposed adjacent to the medium-facing surface and separated from each other by more than one micron;

a second magnetic loop terminating in the write pole tip and a deflection pole tip that is disposed adjacent to the medium-facing surface between the write pole tip and the trailing end, the write pole tip and the deflection pole tip magnetically coupled to each other across a nanoscale nonmagnetic gap;

an electrically conductive coil section that is at least partly encircled by one of the magnetic loops to induce a magnetic flux to traverse the write pole tip;

wherein the magnetic flux traversing the write pole tip has a maximum strength in the media layer at a distance from the write pole tip that is less than a spacing between the write pole tip and the trailing end; and

wherein the nonmagnetic gap expands at a throat height, the throat height being measured from the medium-facing surface and being less than one-half micron.

21. (Original) The head of claim 12, further comprising a magnetoresistive sensor disposed between a plurality of ferromagnetic shields and adjacent to the return pole tip.

22. (Currently Amended) ~~The head of claim 12,~~ A magnetic head for writing information on a relatively-moving medium including a media layer and a soft magnetic underlayer, the head comprising:

a body having a leading end, a trailing end and a medium-facing surface;

a first ferromagnetic loop terminating in a write pole tip and a return pole tip that are disposed adjacent to the medium-facing surface and separated from each other by more than one micron;

a second magnetic loop terminating in the write pole tip and a deflection pole tip that is disposed adjacent to the medium-facing surface between the write pole tip and the trailing end, the write pole tip and the deflection pole tip magnetically coupled to each other across a nanoscale nonmagnetic gap;

an electrically conductive coil section that is at least partly encircled by one of the magnetic loops to induce a magnetic flux to traverse the write pole tip;

wherein the magnetic flux traversing the write pole tip has a maximum strength in the media layer at a distance from the write pole tip that is less than a spacing between the write pole tip and the trailing end; and

further comprising a magnetoresistive sensor disposed less than one-half micron from the return pole tip.

23. (Currently Amended) ~~The head of claim 12,~~ A magnetic head for writing information on a relatively-moving medium including a media layer and a soft magnetic underlayer, the head comprising:

a body having a leading end, a trailing end and a medium-facing surface;

a first ferromagnetic loop terminating in a write pole tip and a return pole tip that are disposed adjacent to the medium-facing surface and separated from each other by more than one micron;

a second magnetic loop terminating in the write pole tip and a deflection pole tip that is disposed adjacent to the medium-facing surface between the write pole tip and the trailing end, the write pole tip and the deflection pole tip magnetically coupled to each other across a nanoscale nonmagnetic gap;

an electrically conductive coil section that is at least partly encircled by one of the magnetic loops to induce a magnetic flux to traverse the write pole tip;

wherein the magnetic flux traversing the write pole tip has a maximum strength in the media layer at a distance from the write pole tip that is less than a spacing between the write pole tip and the trailing end; and

_____wherein a distance between the write pole tip and the deflection pole tip is approximately equal to a spacing between the write pole tip and the soft magnetic underlayer of the medium.

24. (Currently Amended) A magnetic head for writing information on a relatively-moving medium including a media layer and a soft magnetic underlayer, the head comprising:

a body having a leading end, a trailing end and a medium-facing surface;

first and second electrically conductive coils disposed in the body to carry current in substantially opposite directions to induce a magnetic field between the coils that is stronger than the field induced outside the coils, the second coil disposed closer than the first cool to the trailing end;

a ferromagnetic write pole layer disposed between the coils and terminating in a write pole tip that is disposed adjacent to the medium-facing surface;

a ferromagnetic return pole structure that is magnetically coupled to the write pole layer in a region encircled by the first coil, the return pole structure terminating adjacent to the medium-facing surface in a return pole tip having an area at least two orders of magnitude greater than that of the write pole tip and being spaced apart from the write pole tip by at least one micron; and

a ferromagnetic deflection pole structure that is magnetically coupled to the write pole layer in a region encircled by the second coil, the deflection pole structure terminating adjacent to the medium-facing surface in a deflection pole tip that is separated from the write pole tip by a submicron nonferromagnetic gap.

25. (Original) The head of claim 24, wherein the write pole tip has a trailing corner adjoining the nonferromagnetic gap, and magnetic flux emanating from the write pole tip has a maximum density emanating from the trailing corner and directed at an angle that is not perpendicular to the write pole tip.

26. (Original) The head of claim 24, wherein the write pole tip has a trailing corner disposed closest to the trailing end, and magnetic flux emanating from the trailing corner has a maximum density at an angle that is between about twenty degrees and sixty degrees from perpendicular to the medium-facing surface.

27. (Currently Amended) ~~The head of claim 24,~~A magnetic head for writing information on a relatively-moving medium including a media layer and a soft magnetic underlayer, the head comprising:

a body having a leading end, a trailing end and a medium-facing surface;

first and second electrically conductive coils disposed in the body to carry current in substantially opposite directions to induce a magnetic field between the coils that is stronger than the field induced outside the coils, the second coil disposed closer than the first cool to the trailing end;

a ferromagnetic write pole layer disposed between the coils and terminating in a write pole tip that is disposed adjacent to the medium-facing surface;

a ferromagnetic return pole structure that is magnetically coupled to the write pole layer in a region encircled by the first coil, the return pole structure terminating adjacent to the

medium-facing surface in a return pole tip having an area at least two orders of magnitude greater than that of the write pole tip; and

a ferromagnetic deflection pole structure that is magnetically coupled to the write pole layer in a region encircled by the second coil, the deflection pole structure terminating adjacent to the medium-facing surface in a deflection pole tip that is separated from the write pole tip by a submicron nonferromagnetic gap;

wherein the write pole tip has a medium-facing area that is less than about thirty thousand square nanometers.

28. (Currently Amended) ~~The head of claim 24,~~ A magnetic head for writing information on a relatively-moving medium including a media layer and a soft magnetic underlayer, the head comprising:

a body having a leading end, a trailing end and a medium-facing surface;

first and second electrically conductive coils disposed in the body to carry current in substantially opposite directions to induce a magnetic field between the coils that is stronger than the field induced outside the coils, the second coil disposed closer than the first cool to the trailing end;

a ferromagnetic write pole layer disposed between the coils and terminating in a write pole tip that is disposed adjacent to the medium-facing surface;

a ferromagnetic return pole structure that is magnetically coupled to the write pole layer in a region encircled by the first coil, the return pole structure terminating adjacent to the medium-facing surface in a return pole tip having an area at least two orders of magnitude greater than that of the write pole tip; and

a ferromagnetic deflection pole structure that is magnetically coupled to the write pole layer in a region encircled by the second coil, the deflection pole structure terminating adjacent to the medium-facing surface in a deflection pole tip that is separated from the write pole tip by a submicron nonferromagnetic gap;

wherein the write pole tip has a trailing corner adjoining the nonferromagnetic gap, the return pole tip has a leading corner adjoining the nonferromagnetic gap, and the trailing corner is made of higher magnetic saturation material than that of the leading corner.

29. (Currently Amended) ~~The head of claim 24,~~ A magnetic head for writing information on a relatively-moving medium including a media layer and a soft magnetic underlayer, the head comprising:

a body having a leading end, a trailing end and a medium-facing surface;

first and second electrically conductive coils disposed in the body to carry current in substantially opposite directions to induce a magnetic field between the coils that is stronger than the field induced outside the coils, the second coil disposed closer than the first cool to the trailing end;

a ferromagnetic write pole layer disposed between the coils and terminating in a write pole tip that is disposed adjacent to the medium-facing surface;

a ferromagnetic return pole structure that is magnetically coupled to the write pole layer in a region encircled by the first coil, the return pole structure terminating adjacent to the medium-facing surface in a return pole tip having an area at least two orders of magnitude greater than that of the write pole tip; and

a ferromagnetic deflection pole structure that is magnetically coupled to the write pole layer in a region encircled by the second coil, the deflection pole structure terminating adjacent to the medium-facing surface in a deflection pole tip that is separated from the write pole tip by a submicron nonferromagnetic gap;

wherein the nonferromagnetic gap expands at a throat height, the throat height being measured from the medium-facing surface and being less than one-half micron.

30. (Original) The head of claim 24, further comprising a magnetoresistive sensor disposed between a plurality of ferromagnetic shields and adjacent to the return pole tip.

31. (Currently Amended) ~~The head of claim 24, further comprising~~ A magnetic head for writing information on a relatively-moving medium including a media layer and a soft magnetic underlayer, the head comprising:

a body having a leading end, a trailing end and a medium-facing surface;

first and second electrically conductive coils disposed in the body to carry current in substantially opposite directions to induce a magnetic field between the coils that is stronger than the field induced outside the coils, the second coil disposed closer than the first cool to the trailing end;

a ferromagnetic write pole layer disposed between the coils and terminating in a write pole tip that is disposed adjacent to the medium-facing surface;

a ferromagnetic return pole structure that is magnetically coupled to the write pole layer in a region encircled by the first coil, the return pole structure terminating adjacent to the

medium-facing surface in a return pole tip having an area at least two orders of magnitude greater than that of the write pole tip;

a ferromagnetic deflection pole structure that is magnetically coupled to the write pole layer in a region encircled by the second coil, the deflection pole structure terminating adjacent to the medium-facing surface in a deflection pole tip that is separated from the write pole tip by a submicron nonferromagnetic gap; and

a magnetoresistive sensor disposed less than one-half micron from the return pole tip.

32. (Currently Amended) ~~The head of claim 24,~~ A magnetic head for writing information on a relatively-moving medium including a media layer and a soft magnetic underlayer, the head comprising:

a body having a leading end, a trailing end and a medium-facing surface;

first and second electrically conductive coils disposed in the body to carry current in substantially opposite directions to induce a magnetic field between the coils that is stronger than the field induced outside the coils, the second coil disposed closer than the first cool to the trailing end;

a ferromagnetic write pole layer disposed between the coils and terminating in a write pole tip that is disposed adjacent to the medium-facing surface;

a ferromagnetic return pole structure that is magnetically coupled to the write pole layer in a region encircled by the first coil, the return pole structure terminating adjacent to the medium-facing surface in a return pole tip having an area at least two orders of magnitude greater than that of the write pole tip; and

a ferromagnetic deflection pole structure that is magnetically coupled to the write pole layer in a region encircled by the second coil, the deflection pole structure terminating adjacent to the medium-facing surface in a deflection pole tip that is separated from the write pole tip by a submicron nonferromagnetic gap;

wherein a distance between the write pole tip and the deflection pole tip is approximately equal to a spacing between the write pole tip and the soft magnetic underlayer of the medium.

Please add claims:

33. (New) The head of claim 1 wherein the first pole tip has a trailing corner disposed closest to the trailing end, and magnetic flux emanating from the first pole tip has a maximum density emanating from the trailing corner and is directed at an angle at the medium that is not perpendicular to the first pole tip and is toward the second pole tip.

34. (New) The head of claim 12 wherein the write pole tip has a trailing corner disposed closest to the trailing end, and magnetic flux emanating from the write pole tip has a maximum density emanating from the trailing corner and is directed at an angle at the medium that is not perpendicular to the write pole tip and is toward the deflection pole tip.

35. (New) The head of claim 24 wherein the first pole tip has a trailing corner disposed closest to the trailing end, and magnetic flux emanating from the first pole tip has a maximum density emanating from the trailing corner and is directed at an angle at the medium that is not perpendicular to the first pole tip and is toward the deflection pole tip.

REMARKS/ARGUMENTS

The present Amendment is in response to the Office Action having a mailing date of March 16, 2006. Claims 1-32 are pending in the present Application. Applicant has amended claims 1, 12, 17, 19, 20, 22, 23, 24, 27-29, and 31-32. Applicant has also added claims 33-35. Consequently, claims 1-35 remain pending in the present Application.

Applicant has amended claims 1 and 12 to recite that the third, or return, pole tip is between the write (first) pole tip and the leading end. Support for the amendment may be found, for example, in FIG. 1, items 70 and 63 and paragraph 22. Applicant has also amended claim 12 to clarify the relationship between the write pole tip, the magnetic flux generated, and the medium. Support for the amendment can be found, for example, in the specification, paragraph 30 and in FIG. 3, items 70 and 98. In addition, Applicant has amended claim 12 to recite a specific relationship between the areas of the write and return pole tips. Support for the amendment can be found, for example in paragraph 26 of the specification. Applicant has amended claims 17, 19, 20, 22-23, 27-29 and 31-32 to be in independent form and incorporate the limitations of the base claim and any intervening claims. Applicant has also amended claim 29 to correct a minor error. Claims 17, 19, 20, 22-23 have also been amended to correct the rejection under § 112 of base claim 12. Applicant has amended claim 24 to recite that the return pole tip is at least one micron from the write pole tip. Support for the amendment may be found, for example, in FIG. 1, items 63 and 77 and paragraph 7. Applicant has also added claims 33-35. Support for claims 33-35 can be found, for example, in FIG. 3, items 70 and 80 and arrows 98. Accordingly, Applicant respectfully submits that no new matter is added.

In the above-identified Office Action, the Examiner indicated that claims 17, 19, 20, 22-23, 27-29 and 31-32 would be allowable if rewritten in independent form and to address any rejection of the base claims.

Applicant welcomes the indication that claims 17, 19, 20, 22-23, 27-29, and 31-32 include allowable subject matter. Applicant has amended claims 17, 19, 20, 22-23, 27-29, and 31-32 to be in independent form including the limitations of the base claims and any intervening claims, as well as to overcome the rejection under § 112. Accordingly, Applicant respectfully submits that claims 17, 19, 20, 22-23, 27-29, and 31-32 are allowable as currently presented.

In the above-identified Office Action, the Examiner indicated that reference to the cited patent application was missing and that the title was not descriptive. Applicant has amended the specification to include the serial number and filing date of the cited patent application. In addition, Applicant has amended the title. Accordingly, Applicant respectfully submits that any objections to the specification have been addressed.

In the above-identified Office Action, the Examiner objected to the specification under 37 CFR 1.71 because "the subject matter of Cls. 1-11 is not fully disclosed." In claim 1, the Examiner cited the recitation of "at least one micron" spacing between the first and third pole tips and the third ferromagnetic layer being "coupled" to" the first ferromagnetic layer. The Examiner further noted the recitation in claim 7 of the fourth ferromagnetic layer adjoining the first ferromagnetic layer.

Applicant respectfully traverses the Examiner's objection to the specification. All of the elements of claims 1-11 are adequately disclosed in the specification. Claim 1 recites a first ferromagnetic layer, a second ferromagnetic layer, and a third ferromagnetic layer. The first ferromagnetic layer is recited as terminating in a first pole tip that is disposed adjacent to the

medium-facing surface of the body. As the Examiner has apparently concluded, this element corresponds to the first ferromagnetic layer 68 that terminates in a first/write pole tip 70. See, FIG. 1, items 68 and 70 and paragraph 21.

The second ferromagnetic layer is "magnetically coupled to the first ferromagnetic layer distal to the medium-facing surface. . ." Moreover, the second ferromagnetic layer terminates "in a second pole tip that is disposed adjacent to the medium-facing surface, between the first pole tip and the trailing end, and spaced from the first pole tip by a nanoscale nonferromagnetic gap . . ." Such a ferromagnetic layer is described in the specification as the second ferromagnetic layer 78 that terminates in a second/deflection pole tip 80. See, FIG. 1, items 78 and 80 and paragraph 21.

The third ferromagnetic layer is recited as "coupled to the first ferromagnetic layer distal to the medium-facing surface and terminating in a third pole tip disposed adjacent to the medium-facing surface and at least one micron from the first pole tip, the third pole tip having a medium -facing area that is at least two orders of magnitude greater than that of the first pole tip, the third pole tip residing between the first pole tip and the leading end . . ." Such a ferromagnetic layer is described in the specification as the *fourth* ferromagnetic layer 89 that terminates in a third/return pole tip. See FIG. 1, items 89 and 63. Furthermore, the specification states:

> [a] fourth ferromagnetic layer 89 is magnetically coupled to the other ferromagnetic layers 68, 78, and 88 in the coupling region 65 by a second ferromagnetic stud 81, and terminates adjacent the medium-facing surface 66 *in a third pole tip* 63. The fourth ferromagnetic layer 89 may sometimes be called a return pole layer, and the *third pole tip 63 may sometimes be called a return pole tip.*

Specification, paragraph 22. The specification goes on to state that the pole tip 63 "has a medium-facing area that is at least two orders of magnitude greater than that of the first pole tip 70 . . ." Specification, paragraph 26. Thus, the described fourth ferromagnetic layer is coupled to the first ferromagnetic layer by the stud 81, which resides distal to the medium-facing surface. This fourth ferromagnetic layer also terminates in a third pole tip hat has a medium-facing area that is at least two orders of magnitude greater than that of the first pole tip. In addition, a pole tip having these characteristics *and* residing at least one micron from the first pole tip is also described in paragraph 7 of the present Application. Consequently, the recited third ferromagnetic layer terminating in a third pole tip having medium-facing area that is at least two orders of magnitude greater than that of the first pole tip and residing at least one micron from the first pole tip is adequately described in the specification. Moreover, Applicant notes that there is no requirement that a number scheme selected in the specification must also be used in the claims. Accordingly, Applicant respectfully submits that claim 1 finds adequate support in the specification.

The limitations of claim 7 are also adequately described in the specification. Claim 7 recites a fourth ferromagnetic layer "adjoining the first ferromagnetic layer and terminating further than the first pole tip from the medium-facing surface." Such a ferromagnetic layer is described in the specification as the third ferromagnetic layer 88. See FIG. 1 item 88. Moreover, the specification states that the third ferromagnetic layer "adjoins the first ferromagnetic layer 68 but terminates further from the medium-facing surface 66 than the first pole tip 70 . . ." Specification, paragraph 22. Accordingly, Applicant respectfully submits that claim 7 also finds adequate support in the specification. In addition, because the Examiner has no other specific objections to claims 2-6 and 8-11 are adequately disclosed in the specification. Accordingly,

Applicant respectfully submits that the Examiner's objections to the specification have been addressed.

In the above-identified Office Action, the Examiner rejected claims 1-11 under 35 U.S.C. § 112, first paragraph, as directed to subject matter which was not described in the specification in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the invention.

Applicant respectfully traverses the Examiner's rejection. First, second, third, and fourth ferromagnetic layers are disclosed in the specification and can be considered to correspond to the first, second, fourth, and third ferromagnetic layers, respectively, recited in claims 1-11. See, for example, items 68, 70, 78, 88, and 89 in FIG. 1 and paragraphs 7, 21, and 22. Accordingly, Applicant respectfully submits that claims 1-11 are allowable under 35 U.S.C. § 112, first paragraph.

In the above-identified Office Action, the Examiner also objected to the drawings as not showing each feature of Claim 1. As described above, the features of claim 1 (as well as claims 2-11) are shown in the drawings. See, for example, FIG. 1, items 68, 70, 78, 80, 88, 89, and 63. Accordingly, Applicant respectfully submits that no correction to the drawings is needed.

In the above-identified Office Action, the Examiner rejected claims 1-11 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In particular the Examiner cited the clause "wherein the magnetic flux traversing the write pole tip has a maximum strength in the media layer at a location that is closer than the write pole tip to the trailing end. . ." recited in claim 12.

Applicant respectfully traverses the Examiner's rejection. Claim 12 currently recites "wherein the magnetic flux traversing the write pole tip has a maximum strength in the media layer at a distance from the write pole tip that is less than a spacing between the write pole tip and the trailing end." One embodiment of such a structure is depicted in FIG. 3. See, for example, FIG. 3 items 70 and 98 and paragraph 30. Accordingly, Applicant respectfully submits that claims 12-23 are clear and definite.

In the above-identified Office Action, the Examiner rejected claims 12, 13, 18, and 21 under 35 U.S.C. § 102 as being anticipated by U.S. Patent No. 6,954,340 (Shukh). In so doing, the Examiner referenced FIG. 14 of Shukh. The Examiner analogized item 42 as the recited return pole, item 51 as the recited write pole, item 52 as the recited deflection pole, and item 53 as the recited nanoscale gap.

Applicant respectfully traverses the Examiner's rejection. Claim 12 recites a magnetic head including a body having a leading end and a trailing end. Claim 12 recites a first ferromagnetic loop terminating in a write pole tip and a return pole tip that are disposed adjacent to the medium-facing surface, separated from each other by more than one micron, and in which the return pole tip has an area that is at least two orders of magnitude greater than that of the write pole tip. Claim 12 also recites that the return pole tip resides between the write pole tip and the leading end. In addition, claim 12 recites a second magnetic loop terminating in the write pole tip and a deflection pole tip that is disposed adjacent to the medium-facing surface between the write pole tip and the trailing end. Claim 12 also recites that the magnetic flux traversing the write pole tip has a maximum strength in the media layer at a distance from the write pole tip that is less than a spacing between the write pole tip and the trailing end.

Shukh does describe a system having a leading pole 42 that also serves as a shield, a write pole 51 and another pole 52. Shukh, col. 6, lines 10-52. However, in Shukh's discussion of the head depicted in FIG. 14 of Shukh, Applicant can find no mention of any particular relationship between the area of the write pole tip and that of the return pole tip. More specifically, Shukh fails to teach or suggest a return pole tip having a medium facing area at least two orders of magnitude grater than that of the write pole tip. Similarly, Applicant has found no mention in Shukh of any relationship between the distance between the write pole tip and the maximum strength of the magnetic flux and the spacing between the write pole tip and the trailing end. Thus, Shukh fails to teach or suggest a head configured such that the magnetic flux traversing the write pole tip has a maximum strength in the media layer at a distance from the write pole tip that is less than a spacing between the write pole tip and the trailing end. Shukh, therefore, fails to teach or suggest the head recited in claim 12.

Claims 13, 18, and 21 depend upon independent claim 12. Consequently, the arguments herein apply with full force to claims 13, 18, and 21. Accordingly, Applicant respectfully submits that claims 12, 13, 18, and 21 are allowable over the cited references.

Claims 13 and 18 are also separately allowable over the cited references. Claims 13 and 18 recite specific angles for the magnetic flux emanating from the trailing corner. Applicant has found no mention in Shukh of such specific angles for the magnetic flux from the trailing corner of the write pole tip. Consequently, claims 13 and 18 are separately allowable over the cited references.

In the above-identified Office Action, the Examiner also rejected claims 12-16, 18, 21, 24-26, and 30 under 35 U.S.C. § 102 as being anticipated by U.S. Patent No. 6,720,972 (Mochizuki). In so doing, the Examiner cited FIG. 10 of Mochizuki.

Applicant respectfully traverses the Examiner's rejection. Claims 12 and 24 recite heads including a body having a leading end, a trailing end and a medium-facing surface. Both claims 12 and 24 recite return pole tips adjacent to the medium-facing surface, having an area at least two orders of magnitude greater than that of the write pole tip, and spaced apart from the write pole tip by at least one micron. Claims 12 and 24 also recite deflection pole tips separated from the write pole tip by a submicron nonferromagnetic gap.

Mochizuki describes a structure having a main pole tip and two auxiliary poles. Mochizuki, FIG. 10 items 1, 3a, and 3b. In the head described by Mochizuki, the thickness of the leading auxiliary pole 3a is less than the thickness of the trailing auxiliary pole 3b. Mochizuki, col. 7, lines 9-12. In addition, the relationship between the areas of the auxiliary poles is indicated. Mochizuki, col. 6, lines 63-66. However, Applicant has found no indication in Mochizuki that the area of one a particular one of the auxiliary poles is two orders of magnitude greater than that of the main pole. Consequently, Mochizuki fails to teach or suggest the heads recited in claims 12 and 24. Accordingly, Applicant respectfully submits that claims 12 and 24 are allowable over the cited references.

Claims 13-16, 18, and 21 depend upon independent claim 12. Claim 25-26, and 30 depend upon independent claim 24. Consequently, claims 13-16, 18, 21, 25-26, and 30 are allowable over the cited references.

Claims 18 and 26 are also separately allowable over the cited references. Claims 18 and 26 recite specific angles for the magnetic flux emanating from the trailing corner. Applicant has found no mention in Mochizuki of such specific angles for the magnetic flux from the trailing corner of the write pole tip. Consequently, claims 18 and 26 are separately allowable over the cited references.

The citation by the Examiner of U.S. Patent No. 6,791,976 (Shukh II) and U.S. patent No. 7,009,812 (Hsu) do not change the above conclusion. Applicant has found no mention in Shukh II or Hsu of heads including the combination of elements recited in claims 12-16, 18, 21, 24-26, and 30. Accordingly, Applicant respectfully submits that claims 12-16, 18, 21, 24-26, and 30 are allowable over the cited references.

New claims 33-35 depend upon independent claims 1, 12, and 24, respectively. Consequently, the arguments herein apply with full force to claims 33-35. Accordingly, Applicant respectfully submits that claims 33-35 are allowable over the cited references.

Applicant's attorney believes that this application is in condition for allowance. Should any unresolved issues remain, Examiner is invited to call Applicant's attorney at the telephone number indicated below.

Respectfully submitted,

SAWYER LAW GROUP LLP

June 6, 2006
Date

/Janyce R. Mitchell/ Reg. No. 40,095
Janyce R. Mitchell
Attorney for Applicant(s)
(650) 493-4540